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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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Sujit Sharan

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EXAMINER

KILDAY, LISA A

ART UNIT

PAPER NUMBER

2829

DATE MAILED: 09/12/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/825,613

Applicant(s)

SHARAN ET AL.

Examiner

Lisa A Kilday

Art Unit

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 11 June 2002.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-4 and 29 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-4 and 29 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892) 4) ☐ Interview Summary (PTO-413) Paper No(s) _____
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) 5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ 6) ☐ Other: _____

Claim Rejections - 35 USC § 112

The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

Claim 1 is rejected under 35 U.S.C. 112, first paragraph, as containing subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention. The term "ion promoting atmosphere" is not enabled in the specification because it can contain inert/noble gases (see ¶ 37), combinations of inert/noble gases (¶ 37), or gases that are not inert (¶ 38), therefore reactive. With the exception of the inert gases found in ¶ 37, all gases are reactive. The gases available as ion promoter gas are limitless.

The selection of the ion promoting gas will greatly vary the material deposited and may result in a dielectric to be deposited. For example, if oxygen is chosen as the ion promoter gas, you will deposit Titanium oxide, which is a dielectric, not a metal. It is impossible from claim 1 to determine a suitable ion promoter gas that will deposit a metal.

Claim 1 is rejected under 35 U.S.C. 112, first paragraph, because the specification, while being enabling for contacting a substrate with a plasma, does not reasonably provide enablement for a plasma of 50-90% of a metal-containing gas. The specification does not enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make the invention commensurate in scope with

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these claims. According to the specification (§ 27), the metal-containing gas cannot be 50-90% of the plasma because the flow rates of the reactants are: TiCl₄ 10-50 sccm, H₂ 10,000 sccm, and reaction-promoter gas 4,000 sccm. The metal containing gas is less than 0.3 % of the homogenous plasma, not 50-90% of the plasma. Therefore the specification does not support a plasma containing 50-90% of a metal-containing gas. The applicant does not provide any disclosure that the plasma is 50-90% of a metal containing gas.

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

The term "50 to 90% of a metal-containing gas" in claim 1 is a relative term which renders the claim indefinite. The term " 50 to 90% of a metal-containing gas " is not defined by the claim, the specification does not provide a standard for ascertaining the requisite degree, and one of ordinary skill in the art would not be reasonably apprised of the scope of the invention. The term "approximately 50 to 90% of a metal-containing gas" can be interpreted to mean that the plasma contains 50-90% of a metal-containing gas. However, it can be interpreted to mean that approximately 50 to 90% of a metal-containing gas is part of the homogenous plasma which contacts the substrate.

According to the specification (§ 27), the metal-containing gas cannot be 50-90% of the plasma contacting the substrate because the flow rates of the reactants are: TiCl₄ 10-50 sccm, H₂ 10,000 sccm, and reaction-promoter gas 4,000 sccm. According to the specification, the metal containing gas is less than 0.3 % of the homogenous plasma, not the claimed 50 to 90%. The applicant does not provide any disclosure that

the plasma is 50-90% of a metal containing gas. Therefore for examination purposes, the term "approximately 50-90% of a metal-containing gas" will be interpreted to mean that 50-90% of the plasma contacts the substrate.

Claim Rejections - 35 USC § 102

The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

Claims 1-4, 29 rejected under 35 U.S.C. 102(e) as being anticipated by Zhao et al. (6,051,286). In re claim 1, Zhao teaches a process of PECVD deposition of metal films by contacting a substrate with a plasma of approximately 50-90% of a metal containing gas in said ion promoting atmosphere (col. 36 lines 21-24 and 41-67).

In re claim 2, Zhao teaches helium as an ion promoting gas (col. 2 lines 10-12).

In re claim 3, Zhao teaches that the temperature range is approximately 150-500C (abstract, col. 3 lines 38-40, col. 4 lines 60-62).

In re claim 4, Zhao teaches that the pressure range is 1 mTorr to 10 Torr (col. 6 lines 52-53).

In re claim 29, Zhao teaches contacting a surface with a plasma of approximately 50-90% metal containing compound in a chemically inert atmosphere (col. 36 lines 21-24 and 41-67).

Response to Arguments

Applicant's arguments filed 6/11/02 have been fully considered but they are not persuasive. Applicant argues that Zhao teaches away from a plasma of approximately 50-90% of a metal-containing gas in said ion promoting atmosphere. As noted in 112

rejections above, the applicant does not provide any disclosure that the plasma is 50-90% of a metal containing gas. The applicant's specification fails to support the claim that the plasma used in forming a metal layer is 50-90% of a metal-containing compound. Since the metal deposition occurs in a closed CVD chamber, 50-90% of the plasma contacts the substrate during the process of Zhao.

Conclusion

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Bogach et al., « Process for obtaining titanium dioxide and a plasmo-chemical reactor for carrying out said process », WO 97/19895.


Any inquiry of a general nature or relating to the status of this application should be directed to the Group Receptionist whose telephone number is (703) 308-0957. See MPEP 203.08.

Any inquiry concerning this communication from the examiner should be directed to Lisa Kilday whose telephone number is (703) 306-5728. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Michael Sherry, can be reached on (703) 308-1680. The fax number for the group is (703) 305-3432. MPEP 502.01 contains instructions regarding procedures used in submitting responses by facsimile transmission.

Lisa Kilday

LAK

8/28/02


8/29/02
MICHAEL SHERRY
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